

CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this application.

1. (Currently amended) A composite spectral measurement method comprising an incident unit, a probe, a receiving unit and a data processing unit, wherein:

~~an incident light source in~~ said incident unit is a composite light source, ~~which is comprised of a continuous light source and a discrete light source; that is, the discrete continuous light source including includes at least one single wavelength light source, or is composed of a continuous light source and continuous light sources with different characteristics; and~~

said probe configured to position ~~may make~~ the continuous light source and the discrete light source to conduct light incidence and receipt at one and the same position or at different positions, and decide a layout of optical lengths according to light intensities of respective light sources, or may make the continuous light source and the discrete light source to conduct light incidence and receipt at different positions, and decide a layout of optical lengths according to light intensities of respective light sources;

the composite spectral method comprising steps of ~~is implemented~~ in said receiving unit, ~~which includes adding the overlapped continuous and discrete spectra overlapped and adding the non-overlapped continuous and discrete spectra non-overlapped; and~~

in said data processing unit, analyzing the composite spectra received by the receiving unit ~~are analyzed and calculated calculating by using a mathematical model so as to derive a concentration of a certain component of interest such as blood glucose.~~

2. (Currently amended) The composite spectral measurement method according to Claim 1 wherein said continuous light source comprises ~~is an~~ acoustic optical tunable filter NIR spectrometer; said discrete light source comprises one of ~~is a~~ light-emitting diode LED, ~~or a~~ laser diode LD, or a tunable semiconductor laser, ~~and preferably it is one or several LDs;~~ said continuous light source is light-split by

an AOTF selectively, and said discrete light source LD is light-split by the AOTF selectively or controlled by a spatial chopper, wherein a wavelength range of said continuous light source comprises ~~can be any wavelength band within between about 0.8-2.5 μ m, while for that of and wherein a wavelength range of~~ said discrete light source, comprises several wavelengths within or beyond the wavelength range of said continuous light source ~~can be chosen~~.

3. (Currently amended) The composite spectral measurement method according to Claim 1 wherein switching of said composite light source is ~~can be~~ conducted by a light path switching or a circuit switching controlled or uncontrolled by AOTF, wherein the light path switching is achieved ~~can be realized by using an electrical signal to control an electrical shutter, while and wherein the circuit switching is~~ can be achieved by a spatial chopper or a computer.

4. (Currently amended) The composite spectral measurement method according to Claim 1 wherein the sequential control is ~~can be~~ achieved by: in two ways: one is to separately measure the continuous spectra and discrete spectra, that is, first measuring measure the continuous spectra, then the discrete spectra, or first measuring the discrete spectra then first while the continuous spectra later; the other one is cross measurement, that is, or alternately measuring the continuous spectra and discrete spectra are alternately measured in the order of wavelengths.

5. (Currently amended) The composite spectral measurement method ~~methods~~ according to Claim 1 wherein both said continuous light source and said discrete light source are light-split by an AOTF; in every measurement cycle, the AOTF starts first, and when the AOTF reaches the wavelength of each discrete light source, a D/A conversion card controls the AOTF to begin a its special working mode, and then the combined spectra are superposed and pass the AOTF; ~~at the same time, said computer wherein the data processing unit is notified of the special working mode and produces then it gives a control signal to select and start corresponding photoelectric conversion and processing circuits 13, 14 and 18 with different gains; after that, subsequently the AOTF returns to a its normal working mode.~~

6. (Currently amended) The composite spectral measurement method ~~methods~~ according to Claim 1 wherein an the AOTF conducts light-splitting for said continuous light source and, whereas said discrete light source directly irradiates on said probe; in every measurement cycle, the AOTF starts first, and when the AOTF reaches the wavelength of each discrete light source, a D/A conversion card

controls the AOTF to begin a its special working mode, and then the combined spectra are superposed and pass the AOTF; ~~at the same time, said computer~~ wherein the data processing unit is notified of the special working mode and ~~then it gives produces~~ a control signal to select and start corresponding photoelectric conversion and processing circuits ~~13, 14 and 18~~ with different gains; ~~after that,~~ subsequently the AOTF returns to a its normal working mode.

7. (Currently amended) The composite spectral measurement method ~~methods~~ according to Claim 1 wherein an ~~the~~ AOTF conducts light-splitting for said continuous light source, ~~whereas and~~ said discrete light source directly irradiates on said probe; in every measurement cycle, the AOTF starts first, and when the AOTF reaches the wavelength of each discrete light source, a D/A conversion card controls the AOTF to let said discrete spectra among the composite spectra pass, but prevent the continuous spectra from passing; ~~at the same time, said computer~~ wherein the data processing unit is notified and ~~then it gives produces~~ a control signal to select and start corresponding photoelectric conversion and processing circuits ~~13, 14 and 18~~ with different gains; ~~after that,~~ subsequently the AOTF returns to a its normal working mode.

8. (Currently amended) The composite spectral measurement method ~~methods~~ according to Claim 1 wherein an ~~the~~ AOTF conducts light-splitting for said continuous light source, ~~whereas and~~ said discrete light source directly irradiates on said probe; in every measurement cycle, said continuous light source controlled by the AOTF starts first; when one cycle is completed, a D/A conversion card controls each discrete light source ~~and enables it to begin work, and at the same time, said computer~~ wherein the data processing unit is notified and ~~then it gives produces~~ a control signal to select and start corresponding photoelectric conversion and processing circuits ~~13, 14 and 18~~ with different gains.

9. (Currently amended) A spectral detection instrument ~~using the composite spectral measurement method according to Claim 1, comprising three modules, comprising~~ an incident unit ~~(1a), a probe (1) and a receiving unit (1b) wherein:~~

an incident light path of said probe ~~(1)~~ is composed of an incident transmission fiber ~~(2)~~ of said continuous light source and an incident transmission fiber ~~(6)~~ of said discrete light source; an AOTF crystal ~~(4)~~ is used for light-splitting; said discrete light source comprises ~~(9) can be one or several~~ LDs of different wavelengths, a set of focusing lens is used for coupling said LD with said incident transmission

fiber (6) of said discrete light source, ~~at the same time, further comprising~~ an LD gating baffle (7) controlled by a spatial chopper (7a) ~~is chosen for use~~ as a gating switch; a receiving light path of the probe (1) is configured through a connection between a receiving fiber and photoelectric conversion and processing circuits (13 and 14) with different gains; ~~after that, a control function of a controller (12) is achieved by~~ for choosing, by a computer, output signals in corresponding channels of the photoelectric conversion and processing circuits (13 and 14); wherein after being processed by a shielded thermal equilibrium cover and a fine tuning alignment device (15), the output signal is transferred to an NI terminal board or a shielded joint (16), and ~~finally a relevant data processing is performed by a computer (17).~~

10. (Currently amended) The spectral detection instrument ~~using the composite spectral measurement method~~ according to Claim 9 wherein said incident light path of said discrete light source of said incident unit is light-split by the AOTF crystal (4) ~~selectively similarly to said continuous light source.~~

11. (Currently amended) The spectral detection instrument ~~using the composite spectral measurement method~~ according to Claim 9 wherein said receiving light path of said probe (1) is configured through a direct connection of a said receiving fiber (11) or (19) and (20) with a said gain-tunable photoelectric conversion and processing circuit (18); after being processed by a said shielded thermal equilibrium cover and a said fine tuning device (15), the output signal is transferred to an said NI terminal board or a said shielded joint (16), and ~~finally said relevant data processing is performed by a said computer (17).~~

12. (Currently amended) The spectral detection instrument ~~using the composite spectral measurement method~~ according to Claim 9 wherein said probe (1), said continuous light source and said discrete light source are positioned ~~placed~~ at one and the same position; ~~in the central position of said probe,~~ said discrete light source transmission fiber (6) and said continuous light source transmission fiber are positioned at a central position of the probe (2) are placed; said receiving fiber (11) is provided in an external ring of said probe; ~~such a layout effectively concentrates incident light intensity, and simultaneously prevents a majority of stray light that hasn't been scattered by deep tissue but only reflected by surface from being received.~~

13. (Currently amended) The spectral detection instrument ~~using the composite spectral measurement method~~ according to Claim 9 wherein said continuous light source and discrete light source are positioned ~~place~~ at different positions; said discrete light source transmission fiber (6) is positioned ~~placed~~ in the center ~~centre~~ of said probe, and said inner receiving fiber (19) is positioned ~~placed~~ in an ~~its~~ internal ring, while said outer receiving fiber (20) is positioned ~~placed~~ in an ~~its~~ external ring, and said continuous light source transmission fiber (2) is placed in a ~~it~~ middle ring; ~~such a layout utilizes the light intensity of said discrete light source thoroughly, where dispersed light irradiates on the target position, and the internal and external light paths are used to receive the fully reflected light from the tissue, greatly increasing the intensity of detectable biological signals~~

14. (Currently amended) The spectral detection instrument ~~using the composite spectral measurement method~~ according to Claim 9 wherein said discrete light source LD in the incident unit (1a) of said non-invasive detection instrument is coupled with an optical fiber, wherein said discrete light source LD (9) is coupled with said discrete light source incident fiber (6) through said focusing lens ~~(8a and 8b)~~.

15. (Currently amended) The spectral detection instrument ~~using the composite spectral measurement method~~ according to Claim 9 wherein for blood glucose measuring, ~~optional~~ wavelengths of said discrete light source are 980nm, 1310nm, 1550nm, 1610nm and 1650nm.

16. (New). The method of claim 1, wherein the component of interest comprises blood glucose.